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## A new American *Phytophthora*.

ROLAND THAXTER.

The Lima beans in the vicinity of New Haven, within a radius of at least fifteen miles, have been subject during the present season to a serious disease resulting from the attack of a species of *Phytophthora*, quite different from the common *P. infestans* both in its general appearance and microscopic characters. The disease was first observed early in September, in the town of Hamden, where it was causing great damage in "truck" gardens, resulting in the destruction of a large percentage of the crop. The pods at different stages of maturity furnish the favorite point of attack, although the fungus occurs frequently on the young bean shoots, and sometimes, but more rarely, upon the leaves and petioles. On the pods it appears as a clear white felted coating, covering them entirely or forming irregular patches extending usually to both surfaces. The young shoots, although often considerably swollen and distorted, were found to contain no oospores; neither were the latter observed in any of the pods examined. The disease spreads rapidly, like its congener, and the pods, soon after the *Phytophthora* has appeared on any part of them, fall a ready prey to various saprophytic forms, *Cladosporium*, *Epicoccum*, etc., which complete their destruction and cause them to turn black.

The conidia are much larger than those of *P. infestans* and usually broader in proportion to their length. The conidiophores are also different in their appearance and mode of branching. I was unable to observe the maximum number of zoospores formed in germination; but spores of average dimensions produced from fourteen to sixteen. In a few cases a simple germinal tube was observed, but far more rarely than in *P. infestans*, while the production of secondary conidia as a result of lateral or terminal germination was also seen in a number of cases. The conidiophores are very commonly quite simple above their point of exit through the stomata; but more often arise two or more from a common, slightly swollen, base, above which they may be simple or once dichotomously branched. During long continued

moist weather or when kept in a damp chamber the conidiophores become indefinitely elongated and irregularly branched; but the single dichotomous form is characteristic of the species. Towards their extremities the conidiophores are furnished with the successive vesicular swellings, marking the point of proliferation from the insertion of previously formed conidia, which are characteristic of the genus.

In its large size the species approaches the European *P. Cactorum*; but, although I have not been able to examine specimens of this species, it seems to differ essentially from the one under consideration, both in its larger size and mode of branching. Prof. Farlow informs me that a specimen distributed in the Mycotheca Marchica on Brassica, and labelled "*P. omnivora*" (a form which, together with *P. Fagi* and *P. Sempervivi*, has been shown by de Bary<sup>1</sup> to belong to a single species, *P. Cactorum*) approaches the present species in its luxuriant habit; but on examination proves to be merely *Peronospora parasitica*.

**Phytophthora Phaseoli nov. sp.**

Mycelial hyphæ branched, rarely penetrating the cells of the host by irregular haustoria. Conidiophores slightly swollen at their point of exit through the stomata, arising singly or one to several in a cluster; simple or once dichotomously branched, and once to several times successively inflated below their apices. Conidia oval or elliptical, with truncate base and papillate apex;  $35-50\mu \times 20-24\mu$ . Germination by zoospores, usually fifteen in number, or rarely by a simple hypha of germination. Oospores unknown.

On pods, stems and leaves of the Lima bean (*Phaseolus lunatus*), New Haven, Connecticut, September and October.  
*New Haven, Conn.*

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**Notes on North American Umbelliferæ. I.**

JOHN M. COULTER AND J. N. ROSE.

The series of papers bearing the above title are intended to be supplementary to our *Revision of North American Umbelliferæ*.

CAUCALIS MICROCARPA H. & A. has been sent by C. R. Orcutt from Lower California.

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<sup>1</sup>Bot. Zeit. 1881, pp. 251-265.